state of the Motion variable. If FingerPrevious is the same value as Finger, and Motion has occurred (i.e., Motion is Yes), the process moves to step **930** and both Xmotion and Ymotion are reported. The process then moves to step **935**. However, if the comparison at step **920** yields a No, the process moves directly to step **935**. At step **935**, the value of XabsolutePrevious is set to the value of Xabsolute, the value of YabsolutePrevious is set to the value of Yabsolute, and the value of FingerPrevious is set to the value of Finger. The process then moves to step **940**, where it recycles by jumping back to start.

Referring next to FIG. **9**, the Xcompute process is shown in detail for the generalized case shown in FIG. **8**. As noted previously, the Ycompute process is identical and is therefore not shown separately. The process of FIG. **9** is identical to that shown in FIG. **6** up through step **290**, and the preceding steps will therefore not be discussed again. However, if a No results from the comparison at step **290**, a determination is made that no fingers are in contact with the pad. This causes the variable Xfinger to be set to zero at step **970**.

Steps **295** and **305** are unchanged from FIG. **6** and will not be discussed further. However, if a No results from the comparison at step **305**, then a determination is made that one finger is in contact with the sensor, and the value of the variable Xfinger is set to one at step **975**. By contrast, if the result at step **305** is a Yes, then a determination is made that two fingers are in contact with the sensor and the variable Xfinger is set to two at step **980**. Regardless of the number of fingers in contact with the sensor, the process moves to step **320** and ends until the next cycle.

Another function achievable with the detection method and apparatus of the present invention may be referred to as edge lock. Because a touch sensor can detect, in absolute terms, where on the sensor the operative coupling occurs, it is possible to detect that one or more fingers have reached the edge of the sensor. In some instances, the user intends to continue the movement he was engaged in when he hit the edge; for example, a drag function involving two fingers, in which the two fingers hit the edge before the object being dragged has reached its destination. In the environment of a mouse, the user simply picks up the mouse while holding the button down, puts it back down and moves again. In the context of a touchpad, however, removal of the two fingers may be perceived as termination of the function even though such termination was not intended. To avoid such problems, the function in which the user was engaged at the time the fingers hit the edge may remain active—i.e., locked in—for a delay period. If the fingers are placed down on the touchpad within the delay period, the user continues with the earlier function. If the user does not place down the fingers within a predefined delay, the function is terminated and a new function begins when the user again places the fingers in operative contact with the sensor.

It will be appreciated from the foregoing that the present invention allows numerous multi-finger gestures to be detected and converted to mouse-related functions for moving a cursor and control of operating environments or applications programs. However, while some exemplary functions and exemplary definitions for particular sequences have been provided above, it is to be understood that the present invention is not limited to the association of a particular function with a particular sequence or to any particular set of functions. Instead this aspect of the invention is directed to the ability to identify and process various sequences in which one or more fingers are either absent or present, interspersed with motion or lack of motion of the finger or fingers across the touch sensor, to evaluate those sequences either locally or via software on the host, and to report appropriate signals to cause cursor movements or control functions to occur in applications programs or operating environments.

Having fully described various embodiments of the present invention, numerous alternatives and equivalents which do not depart from the invention will be apparent to those skilled in the art. It is therefore intended that the invention not be limited by the foregoing description, but only by the appended claims.

What is claimed is:

1. A method for detecting the operative coupling of multiple fingers to a touch sensor involving the steps of

scanning the touch sensor to (a) identify a first maxima in a signal corresponding to a first finger, (b) identify a minima following the first maxima, (c) identify a second maxima in a signal corresponding to a second finger following said minima, and

providing an indication of the simultaneous presence of two fingers in response to identification of said first and second maxima.

2. The method of claim **1** further including the step of causing a pointing device click function to occur in response to the detection of at least a second maxima.

3. The method of claim **1** further including the step of enabling a "drag" function to occur in response to the detection of at least a second maxima.

4. The method of claim **1** further including the step of enabling a "select" function in response to the detection of at least a second maxima.

5. The method of claim **1** further including the step of enabling an "ink" function in response to the detection of at least a second maxima.

6. The method of claim **1** wherein said touch sensor includes a plurality of lines, said maxima being a largest local variation in a signal value on one of said lines due to capacitive coupling of a finger.

7. The method of claim **6** wherein said maxima are peaks.

8. The method of claim **1** further comprising the step of comparing a distance between said first maxima and said second maxima to a predefined threshold.

9. The method of claim **1** further comprising the steps of:

providing a first control function in response to the detection of the movement of two fingers:

detecting the reaching of an edge of said touch sensor by said two fingers;

detecting a first time corresponding to the removal of said fingers from said touch sensor;

detecting a second time corresponding to the replacement of said two fingers on said touch sensor; and

continuing said first control function if said first and second times are within a predetermined time limit of each other.

10. The method of claim **1** further comprising the step of:

detecting a distance between said first and second maxima.

11. The method of claim **1** further comprising the step of:

providing a drag control function in response to detecting a movement in substantial unison of two said fingers.

12. The method of claim **1** further comprising the step of:

providing a click function in response to the removal and reappearance of said second maxima within a predetermined period of time.